UNITED
NATIONS

TD

United Nations Conference
on Trade and Development

Distr.
GENERAL

TD/B/CN.1/13
24 September 1993

Original: ENGLISH

TRADE AND DEVELOPMENT BOARD
Standing Committee on Commodities
Second session
Geneva, 1 November 1993
Item 3 of the provisional agenda

SITUATION AND PROSPECTS FOR COMMODITIES

Identification and analysis of factors affecting commodity markets with a view, *inter alia*, to reducing distortions

Report by the UNCTAD secretariat

GE.93-53513

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Annex : Long-term market situation for individual commodities

Introduction

1. The VIII session of the Conference identified among the aims to be pursued by the international community in the commodities field, the goal of "improving the functioning of commodity markets by reducing the distortions affecting supply and demand".[1] The Conference further agreed "that distortions in commodity markets require a comprehensive analysis and a new and forward-looking approach" and requested the Standing Committee on Commodities, through the Trade and Development Board, "to undertake a comprehensive analysis regarding commodity policy and explore new, market-oriented approaches to commodity policies", with the aim of finding ways and means for achieving, *inter alia*, "a better functioning and enhanced transparency of commodity markets".

2. These decisions by the Conference were reflected in the Terms of Reference of the Standing Committee on Commodities, adopted at the second part of the thirty-eighth session of the Trade and Development Board, and in the work programme adopted by the Standing Committee on Commodities at its first session.

3. The purpose of this paper is to assist the Standing Committee on Commodities in the identification and analysis of factors affecting commodity markets from the perspective of improving the functioning of these markets, *inter alia*, through removing distortions. It should, of course, be considered an initial attempt, open to improvement and further elaboration.

I. COMMODITIES AND MARKETS

4. The range of factors affecting commodity markets is very wide. At the most fundamental level, there are structural determinants of supply and demand. Their impact tends to be reflected in long-term price trends. Purposive action can attempt to influence such factors in socially desirable ways, for example through promotion of the consumption of commodities which are preferable from a health or an environmental point of view. The effects of such action, however, are also likely to be felt mostly in the long term.

5. Other factors also affect the way in which commodity markets allocate resources in the medium and short run. In general, for markets to allocate resources efficiently through price signals resulting from supply and demand, they should approximate the model of pure competition. As is well known, the model requires that there be many buyers and sellers, none of whom can individually influence the price; that the goods traded be homogeneous; that buyers and sellers have complete information about the market; and that new sellers have free entry into the market. An important further condition, less often discussed in the economic literature but particularly crucial in commodity markets, is that sellers be able to exit the market.

6. When markets approach these conditions, optimal allocation also requires that buyers and sellers be free to agree on prices and quantities traded without undue government interference.

1. Market imperfections and market failure

7. Real life markets, however, rarely meet these conditions, and commodity markets are notorious for failing in some of them. A number of markets for unprocessed commodities shows a concentration of buyers and/or sellers. The existence of a small number of buyers is sometimes a result of barriers to entry

into the processing industry for the commodity. More often, even if there is a reasonable number of buyers, some have the size and strength that could enable them to influence prices. In such cases, since buyers of the unprocessed commodity are in turn sellers of the processed one, the market for the latter shows a concentration of sellers. Furthermore, for many commodities, the large participating companies are vertically integrated along the various processing stages. In the agricultural sector, this situation seldom applies to the production of the raw commodity (although this used to occur in the past) and, therefore, the lower the processing stage, the more likely it is that there will be significant buyers' power in commodity markets. In the case of some minerals, there is concentration at the level of mine production. When a market exhibits oligopsony and/or oligopoly features, there is the risk of tacit or purposive collusion with implications for the efficient allocation of resources which are well documented in economic theory. Further research is needed on the extent to which this risk actually materializes in individual commodity markets.

8. Market concentration is also related to the availability of complete information. While there is no market with perfect information, commodity markets often exhibit particularly serious shortcomings in this field. These relate mainly to the uneven distribution of the information, which tends to be in the hands of the bigger firms. In some cases, large commodity firms actually generate the information with which other market participants operate.

9. Access to information on future market conditions is particularly important in the case of commodities: often their production is possible only after long gestation periods. Lack of appropriate information prevents supply and demand from adjusting smoothly to prices and their changes over time. In the economic literature, this particular situation of commodity production is discussed in terms of the difference between short-term and long-term supply elasticities. Because of investment lags, the adjustment of supply takes time; short-term supply curves are rather inelastic,[2] whereas long-term elasticities are higher. This divergence makes prices and quantities fall successively short and long of equilibrium values over considerable time periods.[3] If demand curves are very inelastic - a typical occurrence for many commodities - the adjustment process, rather than converging towards equilibrium, can move increasingly farther away from it.

10. Regarding conditions for entry and exit, there is an additional consideration that bears heavily on the way commodity markets function. Commodity production and sale provide the source of living for millions of people around the world, including often the poorest among them. Likewise, the economic performance and development prospects of many countries where these people live critically depend on commodities. This fundamental human, social and political dimension of commodity activities is at the root of rigidities in their supply.

11. The heavy dependence of developing countries on commodities for their domestic employment and export earnings has been amply documented.[4] Equally impressive is the sheer number of people involved in commodity activities. This particularly applies to agricultural commodities. For example, an estimated 200 million people in developing countries gain all or part of their cash income from growing cotton, and about 50 million people are employed in its processing. Most of the cotton growing countries where these people live are middle to low income countries. Coffee is a direct source of income for almost 10 million people in the producing countries. Sugar cane production worldwide employs about 3 million people.

12. Market prices thus become the barometer both of the level of resources available to national economies and Governments and of the living conditions for many people at near subsistence levels. This tends to make commodity supply inelastic vis-à-vis falls in prices, or even to respond perversely to production and export increases.[5] Such "social" production rigidities in the supply of commodities, by effectively preventing free exit from the industry, interfere with the optimal allocation of resources through the operation of the markets.

13. Even competitive markets can also fail to allocate resources optimally when there is a large difference between private and social costs and benefits. This is the case of activities affecting the environment, as pollution and other environmental costs and benefits are not normally reflected in market prices, and are therefore "external" to the market.[6] Environmental externalities are of particular relevance in the case of commodities, because minerals, fishery and forestry resources are commodities themselves while agriculture, the largest source of commodity production, is fundamentally dependent on natural resources, particularly land and water. When such divergence between private and social costs and benefits occurs, markets cannot be relied upon to allocate resources in a manner that is socially efficient over the long term, nor to ensure sustainability and optimize natural resource use.

2. Government intervention

14. Commodities are also peculiar in that some, in particular food, are regarded in many countries as important for security or strategic reasons. This, together with the social dimension of commodity production mentioned above, has given rise to intervention by Governments in order to modify price signals, usually by raising the prices paid to producers to support their incomes and/or increase production, or by ensuring stable prices to producers. Governments thus interfere with the free working of the market in order to achieve policy goals, such as income redistribution, increased employment, food security, the protection of domestic industry and the like. Whereas government intervention takes place in both developing and developed countries, the size of this intervention is particularly important in the latter, as intervention is costly and these countries have the resources needed to meet the costs. Such intervention in domestic markets is transmitted to the international market for the commodities, distorting prices as a result.

15. Governments have also intervened in international markets in a concerted manner in order to reduce the excessive price fluctuations resulting from some of the factors discussed below. The instruments of such intervention have been international commodity agreements which bring together consumer and producers of individual commodities. Although these interventions have sometimes helped reduce the magnitude of price fluctuations, they have also sometimes developed into price support mechanisms, thereby aggravating the imbalances, as was illustrated in the case of tin in the mid-1980s.

16. In the language of economics, commodity markets are subject both to market failures and to policy failures. It should be kept in mind, however, that the distinction between the two types of failure and their interrelationships is considerably more complex than at first appears. In the case of the environment, it is generally accepted that government intervention might be needed to correct market failure. However, government intervention might itself produce environmental degradation. Equally, governmental regulation aimed at correcting environmental market failure might create other market distortions, such as raising the barriers to entry and therefore restricting competition.

3. Distortions and imbalances in commodity markets

17. The difficulties faced by the market-price mechanism to fulfil adequately its role of allocating resources efficiently among alternative uses, resulting from the factors mentioned above, has led to recurrent imbalances between supply and demand in commodity markets. Three basic situations may be identified in this regard.

18. In the last decade, the markets for a number of commodities have suffered a prolonged situation of depressed prices with supply exceeding demand for much longer than past cycles. This relatively new occurrence has prompted some commodity analysts to talk about the existence of "structural oversupply" in the markets for these commodities. Agricultural commodities, including tropical beverages (coffee, cocoa and tea), sugar, palm oil, and agricultural raw materials such as cotton and natural rubber have been the main examples. Likewise, the supply of basic foods such as wheat and rice have risen significantly despite severe falls in prices; although potential demand for these items is very high in developing countries, it is constrained by the low income of large sectors of the population of these countries. The production of timber and fish has also been said to be excessive, although not in relation to demand but to a hypothetical level of production that would take into account social costs and benefits in these industries, including their impacts on the environment. Since many of these commodities are storable, the persistence of supply exceeding demand has given rise to the increasing accumulation of stocks. Although for some of these commodities there have been short episodes of production shortfalls, for others, like cocoa, supply growth may be beginning to be exceeded by the growth of demand; nevertheless accumulated stocks overhang the market and act as a continuous depressing influence on prices. The general problem in the markets for this group of commodities appears to have been the inability of supply to adjust downwards in response to falling prices.

19. A second group comprises commodities which exhibit medium-term imbalances between supply and demand but for which, over a long period, demand growth has been able to match the growth in supplies. This has been the case of many minerals and metals such as copper, iron ore, aluminum, zinc, nickel and petroleum, and of a few other agricultural commodities such as bananas, soybean and groundnut oil and tobacco. Supply adjustment problems for these commodities are related to the inability to prevent large swings in the market between periods of excess and insufficient supplies.

20. Finally, output growth has been constrained in a third category but comprising comparatively few commodities among them hard fibres, tin, tungsten and manganese. The markets for these commodities have been severely depressed for a long period as a result of downward shifts in demand. The market situation of commodities in each of the three categories mentioned above is summarized in the annex.

21. Imbalances corresponding to the first two situations are to a significant extent the result of factors distorting the proper functioning of markets. They can be reduced by reducing those distortions. The ensuing restoration of the efficient working of the market would increase social welfare.[7] This, however, raises difficult issues concerning trade-offs between policy objectives. Some of these will be highlighted below. Careful examination of potential conflicts of objectives is therefore needed at the national and international levels.

22. The imbalances which characterize the third situation appear to result primarily from structural features of supply and demand. These, as already indicated, are less responsive to policy interventions in the short and medium term. Evidently, such structural determinants also have an influence in the first two situations.

23. The following three sections identify and analyse the factors affecting commodity markets which have been introduced in the above discussion. Section II deals with structural determinants of commodity supply and demand; section III discusses factors resulting in commodity market failure and section IV deals with government intervention in commodity markets and with the related issue of the influence of non-commodity-related agents in commodity markets. The final section discusses some policy implications from the perspective of possible comprehensive approaches to commodity policies.

II. STRUCTURAL DETERMINANTS OF SUPPLY AND DEMAND

24. Supply and demand in the commodity markets are continuously changing in response to some basic factors, the most important of which is technological change. The incidence of these factors varies among commodities.

1. Technological change and commodity supply and demand

25. Commodity supply has been strongly affected by technological developments and improved management methods. For instance, metals can now be profitably extracted from lower grade ore - and even from accumulated waste from previous mineral exploitations. Formerly inaccessible areas can be exploited, and more metal can be obtained through recycling. In agriculture, technological progress has been reflected in the introduction of high yielding and more disease-resistant varieties as well as in expanded use of inputs such as fertilizers and pesticides and improvement of farm management methods, all of which have increased yields.*

26. While the overall effect of technology is to increase the global supply possibilities for the commodity, the opportunities for technological progress are uneven among regions, countries and individual producers. A related consideration is how the financial benefits from increased production and reduced costs are distributed among producers, suppliers, processors and consumers, nationally and internationally. This depends on the state of the markets and who has the greatest bargaining power.

27. When government intervention or another factor prevents the operation of free market forces, unprotected efficient producers may be deprived of all or a sizeable proportion of the additional income generated by the use of new technologies. Where the use of a technology does not result in increases in output volume but rather in lower costs of production, benefits tend to remain with producers, allowing them to reduce the use of productive resources and to reallocate these to other uses. Where technology results in increased production and price elasticities of demand are low, as is the case for a wide number of commodities, technology-induced increases in production can only be absorbed through more than proportional falls in prices, thus reducing the income earned by producers and benefitting the consumers only. For those commodities where price elasticities of demand are high, for example, some fruits and vegetables, the opposite result will take place.

28. Technological change also affects demand for raw materials, as evidenced by the long-run tendency for the consumption of raw materials per unit of output to decline in developed countries. This has been the result of material savings in industrial processes and substitution of new materials for traditional materials. Increased recycling has contributed to reducing the consumption of primary metals, for example. In developing countries, in contrast, raw material consumption has shown a tendency to increase, with the notable exceptions of wood and steel. This is due to the increasing importance of industry in GDP in these countries, rather than to a shift towards more raw-material-intensive branches within industry.[9] Examples of the many commodities adversely affected by technological developments are: lead, because of increased recycling; tin, as a result of the reduction in the amount of this metal in tinplate production, and its substitution by aluminium and tin-free steel; manganese, where the low grade has suffered a fall in demand because of the drastic reduction in the quantities of ore consumed to produce one tonne of steel in blast furnaces and because of a relative increase in the direct use of high-grade ore in the converters; tungsten, which has experienced a fall in world consumption (from 47 thousand tonnes in 1981 to 41 thousand tonnes in 1991) as a result of substitution and material-saving technologies; and hard fibres, because of substitution of synthetics for these fibres in their traditional end-use as baling twine for agricultural purposes.

2. Other factors

29. The supply of agricultural commodities and the behaviour of their markets and prices are often affected by climatic conditions in producing areas. For example, the coffee market has traditionally been influenced by expectations of weather conditions in Brazil's main producing region. The drought in the United States in 1988/89 was responsible for the sharp fall in world wheat output. Production of tropical products, such as bananas, fluctuates because of floods and hurricanes. Mineral production is affected by occasional disruption in mines, such as those caused by floods, earthquakes and strikes. The importance of these factors varies directly with the geographical concentration of production, which is, in general, higher for minerals than for agricultural commodities. For some of the latter the expansion in output has involved a broadening of the geographical base of production, thus reducing the vulnerability of supply to climatic factors. Such has been the case, for example, with cocoa, since the emergence of South-East Asia as an important new producing region.

30. Changes in economic activity and income, worldwide and locally, stand out among the factors influencing the demand for commodities, mainly raw materials, agricultural as well as mineral. Thus, sluggish economic growth, except in the case of China and South and South-East Asian countries, has remained the main constraint on the growth of commodity demand in recent years. The extent to which changes in economic activity and income affect the demand for individual commodities depends on income and price elasticities.

31. Economic growth rates are a particularly important factor for the markets of those raw materials such as most metals, minerals, and timber, which are inputs to the production of durable items and investment goods. This means that the demand for these raw materials is income-elastic. Although, generally speaking, the demand for food in developed countries is not very income-elastic, changes in income levels may have a substantial impact on the demand for specific foodstuffs where substitutes exist. For example, the demand for tropical beverages, a relatively small item in the consumption basket, has

remained unaffected by the current economic recession in developed countries, but bovine meat consumption has been significantly curtailed. The decrease in beef consumption has also led to a decline in the demand for feedstuffs. The picture is somewhat different in developing countries. Demand for products such as sugar and vegetable oils is more income-elastic in these countries than in developed countries.

32. Commodity demand in developing countries is also affected by price changes. The reason why the consumption of sugar and vegetable oils has increased in developing countries is that the price elasticity of demand for these products is high and, given the depressed level of their prices, the negative impact of declining income growth rates on demand has been offset by the positive impact of lower prices. Conversely, in developed countries a significant impact of changes in commodity prices on demand is seldom observed. For most final products, in particular durable items and sophisticated investment goods, which are produced mainly in industrialized countries, raw materials costs make up only a minor part of the final price. For most manufactured products, changes in commodity prices have a limited effect on prices; thus demand for the raw materials, which is a demand derived from that for the final products, is not greatly affected.

33. A demographic factor affecting demand for foodstuffs in developed countries is a low rate of population growth and a significant aging profile of the population, leading to a tendency towards a lower per capita food consumption and a marginal decline in total food consumption. Other factors are patterns of migration and related, or independent, changes in dietary habits and lifestyles, leading to shifts in consumer preferences. Conversely, high population growth rates in developing countries have been responsible for the growth in world demand for basic foods which are diet staples in these countries, in particular rice. Per capita food consumption has been growing continuously in the developing countries, although at a decelerating rate in the last two decades: after growing by 1.2 per cent in the 1970s, the growth rate of per capita food consumption dipped to 0.2 per cent in the 1980s.

34. Another factor affecting the supply and demand of some commodities in the recent period has been the political and economic upheaval that has taken place in the former USSR. As a result of this, exports of raw mineral commodities such as aluminum, copper and nickel from this region has increased following severe declines in production in heavy industry. Freedom to export on the part of enterprises has also contributed to expanded export sales. Changes in these countries have also affected the tropical timber market through increased exports of sawn softwood which competes, especially in the construction industry, with sawn hardwood from developing countries. Such exports to Europe have increased by 20 per cent since 1991. In the case of wheat, output in the former Soviet Union fell between 1990 and 1991 by 28.4 million tonnes (or 28 per cent) mainly owing to shortages and the high price of inputs for its production.

35. Changes in Central and Eastern Europe and the former Soviet Union have also affected demand for various commodities. In these countries, import demand from developing countries plunged by about one half in 1991. The decline has been significant for a rather wide range of products. Contracting industrial production has reduced the demand for imported metals such as lead, tin and zinc. Cocoa and tea imports have also been curtailed, as priority in the allocation of foreign exchange and credits was being given to imports of basic foodstuffs. Meat imports rose dramatically, triggered by lower supplies of domestic meat in large urban centres and facilitated by special credits and food

aid operations, but they had started to fall by the end of 1992. The longer term demand for tropical and agricultural products in these countries is expected to rise again.

III. FACTORS LEADING TO COMMODITY MARKET FAILURE

36. Sections III and IV will discuss factors which influence the way commodity markets function, distorting the mechanism by which changes in supply and demand are reflected in prices, and conversely, the way supply and demand adjust to changing market prices. These factors prevent the market from fully playing its role of guiding producers and consumers, through the price system, in a way that optimally allocates resources. They are among the determinants of the imbalances in the markets, as indicated earlier in section I. Such factors are directly related to the goal of improving the working of commodity markets by reducing distortions. This is of particular importance since Governments have been putting more emphasis on market forces, as it is crucial that the mechanisms which translate these forces into price signals function correctly.

37. Prominent among the operative factors are those introducing distortions which detract from pure competition. Mention was made of this in section I above. These included availability of information, including that connected with investment lags and business cycles; the number of buyers and sellers and ease of entry into the industry; and "social rigidities" in production related to the exit from commodity activities. Also prominent were the presence of externalities linked to the impact of commodity production on the environment. The distortions caused by outside intervention in the market, such as that derived from domestic policies, will be discussed in the next section.

1. Insufficient market transparency

38. For individual commodity markets to work efficiently, participants need information of many kinds on which to base sound decisions, including investment decisions.[10] Information on the market covers a wide range of aspects: production and installed capacity, imports, exports, stocks, estimated demand, actual and expected prices, cost estimates, technologies, competitors, market-access conditions, taxes and subsidies, government policies, product adaptation, packing standards and labelling, marketing channels and selling arrangements, etc. The availability of information varies among commodities. It is also closely linked to the marketing mechanisms in use-commodities traded on organized markets such as futures or forward exchanges or auctions usually have more reported price information than others. For commodities such as traditional export minerals, where production levels are of a significant scale, information on industry characteristics is usually easier to obtain than for agricultural products based primarily on small-scale farming.

39. Regarding traditional export commodities such as sugar, coffee and cocoa, markets and marketing systems are fairly well-documented for the primary products. However, much less is known for non-traditional and processed products. In some critical areas, there is an acute lack of transparency in the markets. Information on world industry and market structure is at best scanty and usually proprietary. In addition, this information needs continuous updating because the commodity industry is constantly changing as a result of acquisitions, mergers and takeovers. Statistics on real consumption are difficult to obtain for a significant number of commodities. Stock statistics

are in most cases non-existent or inadequate. Many countries and companies are reluctant to release accurate production data as long as other market participants do not do likewise. Statistical information tends to be more complete on those commodities, particularly agricultural, for which there are intergovernmental producer and consumer groups. It is, on the contrary, more difficult to obtain data when a few companies control a substantial proportion of world trade. For this reason, the problem of market transparency is closely linked to that of market concentration.

40. Related to this is the uneven distribution of information. In the current world of uncertainty and keen competition, the role of information, its collection, processing and dissemination, is crucial. Those without the means to handle information flows quickly and efficiently are at a severe disadvantage. Much information is now collected and disseminated through computer networks, a system which requires not only sophisticated equipment but also the skills necessary to use it. Brokers and big traders and firms operating on the commodity markets are usually fairly well informed about vital aspects of the market, its current situation and its prospects. Small-scale farmers and miners are not. The implications are particularly serious when the latter account for the bulk of production, as for many agricultural commodities such as coffee, cocoa and cotton. In mining, while small-scale units do not account for the bulk of production of most minerals, they are far from negligible. They account for 75 per cent of world production of all gemstones, 25 per cent of all industrial minerals, 20 per cent of coal and about 16 per cent of the global combined non-fuel minerals output.[11]

2. Information, investment lags and supply responses

41. Even if market prices could send clear signals to producers, the peculiar characteristics of the production of some commodities would inhibit the ability of producers to adjust their supplies to market changes. The production of many commodities involves more or less long gestation periods of investments. This in turn means that investment decisions must be based on forecasts of future prices rather than on current prices.

42. For agricultural commodities, this situation is tied to the physical characteristics of crops. Cotton, for example, is an annual crop; it can only be replaced by another crop at the next planting season. Other crops, in particular tree crops, take longer. Coffee comes into production three to four years after the trees have been planted and are in full production after six to eight years. Cocoa trees require eight to ten years for yields to peak, depending on the variety. The new hybrids reach a peak faster and can produce acceptable yields for several decades. Rubber is a plantation crop with a gestation period of six to eight years before a harvestable yield is produced. It has a productive life of up to 25 years. Sugar cane production has a cropping cycle of five to seven years. In the case of minerals and metals, investments in new productive capacity also take many years between the first prospecting and the time when output reaches the market.

43. Given these lags, in the absence of sufficient information about other producers' investment plans, the supply response to a period of high prices is likely to result in depressed prices in later years. Once investments are made, production will be maintained for as long as variable costs are covered, even if prices fall below total costs. The extent to which supply can adjust to market prices (the supply elasticity) therefore depends on the relationship between fixed and variable costs; this, in turn, varies with the production

units. Large commercial units are more responsive to price conditions. In contrast, the notion of production cost may seem irrelevant in family-type farming smallholdings, such as those prevailing in rice, cocoa, coffee and cotton production, as often the main input is the farmers' own labour. For this reason, smallholding output cannot be expected to be very sensitive to price changes. If anything, as it has been observed in the case of cocoa and coffee (particularly in robusta-growing countries), many smallholders try to work harder and increase output to compensate for lower prices, giving rise to a backward-sloping supply curve departing from what economic theory would predict under normal conditions.

44. This reaction helps explain, for example, why coffee production is not likely to decrease. However, the fall in coffee prices below estimated variable costs of many larger coffee growers has halted new investments and world coffee supply is expected to increase at only 0.6 per cent over the 1991-2005 period. Industrial cocoa estates in Malaysia and Brazil have responded to the current price depression by reducing output. In Malaysia, some producers have shifted to palm oil production, while in Brazil they have simply disposed of cocoa trees as woodstock. Nevertheless, worldwide cocoa output is expected to be sustained at current levels in the near future, as young hybrid trees come into maturity and major expansion programmes in a number of producing countries, particularly Indonesia, bear fruit. These programmes were initiated in response to high prices prevailing since the mid-1970s through the early 1980s. Their investments were financed through major lending for cocoa development projects by international financial institutions.

45. Once investments have been made in productive capacity, mineral and metal production can be expected to be somewhat more responsive than agricultural commodities to price changes. This is done through changes in plant operating rates. This factor helps explain why most minerals exhibit large medium-term fluctuations rather than persistent oversupply. The case of tin shows that prices have to fall dramatically before a substantial impact on production capacity occurs. The collapse of the international tin market in October 1985, which led to the demise of the International Tin Council, resulted in a deep process of rationalization of the world tin industry. Producers in Bolivia, Malaysia, Thailand and elsewhere were forced to scale down or close their operations, with serious social implications for these countries. In Bolivia, for example, many former small miners reportedly turned to coca cultivation for their living. Eventually, world tin output recovered as production was expanded by low cost producers in Brazil and China.

46. Another example of restructuring in the minerals industry is the case of copper in the United States. When low copper prices prevailing from 1982 onwards persisted, marginal copper producers were forced to close down capacity. This was the case of most of the units owned by petroleum companies which had entered the copper industry during the 1970s. Diversified metal companies turned away from copper production into other minerals and metals. Some of the bigger traditional copper producers closed down uneconomical operations and upgraded technologies in order to raise productivity. As a result, by the late 1980s the United States copper industry had reduced overall costs by 38 per cent and had become more concentrated.

3. Exit from the industry: "social rigidities" and obstacles to diversification

47. A further reason why commodity production cannot easily be cut in periods of low prices is the presence of the "social rigidities" mentioned in section I above. This also includes lack of resources or opportunities to diversify into other commodities, which effectively denies free exit from the industry. This, again, is more of a problem for smallholders and small-scale miners than for large industrial concerns. Many cotton, coffee and cocoa small producers, among others, are simply too poor to afford a shift into other crops, particularly when low prices further reduce their already meager incomes. To this must be added a secular knowledge and tradition of growing a particular crop in many rural areas: in addition there may be dependence on established marketing systems for a crop, whereas such systems are unavailable for other commodities.

48. Constraints to diversification also include limited supply of credit; shortages of various essential inputs, including skills, managerial capacities and technical expertise; underdeveloped support services at the national level; lack of knowledge on trade and investment opportunities; and difficult access into the markets for alternative crops.[12]

49. Natural constraints, such as those of climate and the natural resource base, also place limits on horizontal diversification. This is true for mining, particularly small-scale mining, which is obviously limited to local mineral deposits, as well as for agriculture. With commodity markets generally depressed, the market situation for alternative crops is likewise a restricting factor. Thus, in such countries as Colombia and Costa Rica, few crops were found in the coffee zones that had the same ecological requirements, similar agro-economic characteristics and a world market of similar magnitude. In robusta coffee-growing areas, some alternative crops have been found: cocoa (in West Africa); cloves, pepper and coconuts (in Indonesia). However, the markets for these commodities were depressed as well. In many cotton producing areas, there are few adequate alternative crops, as climatic conditions suitable for cotton growing implies a long hot dry season.

50. Because of these obstacles, the economies of many countries still depend on the production and export of one or two commodities. The absence of possibilities to diversify creates rigidities in supply, limiting the ability of producers to adjust supply of particular commodities downwards when prices fall. Removing these obstacles would therefore contribute to a higher elasticity of supply and thus to a better working of the market. Experience has shown that government policies can play a role in this respect. Coffee no longer makes up over half of Colombia's exports thanks to a successful diversification policy, with a wide range of support measures to stimulate non-traditional export industries. Chile's diversification away from copper owes much to the role of the government export advisory organization. Malaysian exporters have gained considerable market shares in a range of commodities, owing among other things to incentives, government-subsidized research and marketing efforts. In these and in other cases, Governments have not only put in place good macro-economic policies but also decided on which sectors to support by such measures as preferential access to credit or foreign exchange, and which infrastructure and services to supply for these sectors.[13]

51. Often diversification into other commodities has contributed to a situation of excess supply for these commodities. In the absence of good

coordination of investment decisions, imbalances in the markets for individual commodities may be transmitted to the markets for other commodities.

4. Market concentration and barriers to entry

52. The concentration of buyers and/or sellers observed in the markets for some commodities runs counter to one of the conditions for pure competition. This concentration is the result of the barriers to the entry into production, marketing and processing activities, and in turn facilitates the further raising of such barriers. Barriers and the associated concentration vary with the commodities considered and with the degree of processing, being in general higher according to the stage of processing. There are also differences between agricultural commodities, on the one hand, and minerals and metals, on the other.

53. In the case of unprocessed agricultural commodities, concentration exists mainly on the demand side.[14] In this connection, a major barrier to entry in marketing is the need for substantial resources to move to the scale of operation of worldwide markets. Since small-scale producers do not have these resources, they sell individually to a few big international traders and processors which hold a dominant position on the demand side of the market. In turn, the dominant companies are the origin of other barriers to entry into marketing and processing, such as those represented by the exclusive use of trading brands and large publicity outlays to support these brands worldwide, access to credit, warehouses, sophisticated trading techniques, and technology. The market structure thus tends to become self-perpetuating. Governments of some developing countries have in the past aimed at breaking into this structure and facilitating access by exporters to marketing networks. With the recent trend towards liberalization of the economy in many producing countries, however, Governments have often retreated from this involvement. Liberalization of internal and export marketing for commodities in many developing countries, often as part of structural adjustment programmes, has led to an increase in the number of independent exporters supplying world commodity markets. This situation has added to the bargaining power of commodity buyers as well as to the cost of entry, as trading houses active worldwide now have to deal with many more suppliers and are becoming increasingly involved in internal marketing in many countries (particularly African) where national marketing boards or organizations used to operate.

54. Concentration of buying power is well illustrated in the food and beverages sector. In the tea market, the already small number of main firms had decreased during the 1980s while the market power of these firms increased significantly. The sugar and the grains industries have also experienced acquisitions and major expansions by the principal firms. In the agro-food sector, several major firms either merged or bought out other firms.

55. Three large marketing companies have long accounted for a dominant share of banana trade. The perishability of the fruit and the stringent requirements for banana handling and care have made the banana trade and transportation business a high-cost operation where the various stages must be carefully coordinated. Thus, traditionally only companies having control of the whole range of activities from production to final consumer sale, through exacting packing operations, reefer shipping and special chamber ripening in the final markets, were able to deliver the fruit in the conditions demanded by the market. Some producers, however, were able to make inroads in this tightly controlled market, as in the cases of Ecuador, Nicaragua, Colombia and Costa

Rica, thanks, in the case of the latter two countries, to cooperative marketing organizations of producers.

56. In the case of **coffee**, increased concentration in demand stands in contrast to wide competition in supply. On the supply side, there are many producers, as the different varieties of coffee are widely spread throughout the world. In most countries, smallholdings predominate. Producers, particularly the major producing countries, compete to gain market share. This has become particularly evident since the suspension in July 1989 of the quota system operated under the International Coffee Agreement. Even before this suspension, exporters were aiming at increasing their individual quotas and selling coffee at discounts to non-members in what was termed the *two-tier market*. On the demand side, on the contrary, international trade in coffee has been concentrated in a few big trading houses and transnational processing firms. In 1989, about half of roasted and instant coffee production, from which demand for green coffee is derived, was in the hands of only five big transnational corporations. Seven companies accounted for nearly half of world imports of green coffee. This concentration is one reason why the lower price at which green coffee has been traded has not been fully transferred to final consumers. Therefore, lower coffee-producer prices have not been able to encourage final demand, which is affected by competition from substitutes and to a lesser extent by health damage claims.

57. A similar situation is observed in **cocoa**. Whereas the supply side of the cocoa market is fairly competitive, the demand side underwent a process of increased integration in the 1980s through mergers and acquisitions involving big trading houses and cocoa processors. As a result, the processing sector, which is the demand side of the cocoa bean market, is very concentrated, as 10-12 large firms account for over 80 per cent of total world production of cocoa products. Of these, the top five chocolate manufacturers in the world buy at least 40 per cent of world annual cocoa bean production. This concentration in demand for cocoa may well have an influence on prices paid to producers.

58. In the case of minerals, barriers to entry affect both supply and demand and include the high capital- intensity of mining and refining activities, the existence of economies-of-scale and the geographical concentration and varying grade of deposits. The highest concentration in mine production among the major minerals is in **nickel**. In 1989, nearly half of Western nickel ore production was accounted for by only three companies; the ten largest firms produced 77 per cent of Western output. For **bauxite**, **manganese** and **potash**, the ten largest controlling companies accounted for around 80 per cent of total Western world production and the three largest controlled about 40 per cent. For **copper**, **iron ore** and **phosphate rock**, the degree of concentration approached the average for all major minerals, that is, 18 per cent for the single largest company, 34 per cent for the three largest companies and 64 per cent for the ten largest companies. A similar degree of concentration is observed in refined metal production.[11] As a result, the markets for many minerals and metals may be characterized as a "bilateral oligopoly", as illustrated by iron ore: along with the indicated concentration in supply (with around 20 mining companies organized in a smaller number of groups responsible for world total output), on the demand side the big steel companies are organized into powerful buying agencies which negotiate large tonnages with each iron-ore mining company individually. Concentration is further compounded by the complex ownership and control crosslinkages existing between the various major companies involved in mineral trading and processing, and by the fact that many of these companies are active

in several metals, thus contributing to making the various metal markets interrelated.

5. Environmental externalities

59. Environmental costs and benefits of commodity production and trade are not reflected in the market prices for the commodities involved, unless measures are taken to "internalize" them, making them part of private costs and profits. This is a major cause of environmental damage. For example, the recent trend towards increases in agricultural production has been accompanied by environmental problems through pollution owing to over- and mis-application of external inputs such as chemical fertilizers and pesticides, and through the depletion of natural resources as a result of erosion or the degradation of the soil. For example, coffee producers' efforts to increase production have raised the problem of increased pesticide use, as the coffee crop can be significantly affected by pests and disease. Pesticides have been found to have detrimental ecological effects, including soil and water contamination and their accumulation in the animal and human food chain, direct health hazards during preparation and application, and further pest resistance and nutrient depletion. Environmental costs incurred when producing and processing cocoa include deforestation and defoliation at various stages of cocoa production. Also harmful to the environment is the use of chemical fertilizers and pesticides causing water pollution and farmers' health damage. On the other hand, the production and processing of coffee and cocoa have been found to have also positive effects on the environment. These include the fact that some production practices are benign for the environment and neutralize potentially harmful effects, and that in certain areas, the only tree cover consists of coffee, cocoa and shade trees.[16] Coffee trees protect the soil in mountainous volcanic areas and help combat desertification.

60. Over-use of marine resources and non-sustainable fishing practices have led to insufficient conservation and poor resource management. Globally, average annual fish catch is just below its estimated sustainable yield. However, in several of the world's major fisheries (the Pacific Northwest, the Mediterranean, the Black Sea, the Indian Ocean and the southeastern Pacific) sustainable yields have been surpassed. Reliance on market forces has entrained substantial adverse implications for the environment; this has drawn attention to the need for environmental regulation. For example, in 1977, in Chile, incentives were introduced and a free market approach was adopted to promote quick development of the fishery sector. These measures led to an expansion of foreign factory-trawler operations and a spectacular rise in catches and exports. As a result, however, many valuable species were overexploited and restrictions had to be imposed. In the European Community, discussion is under way on reducing the size and capacity of both the Community fleet and the processing industry as a whole in order to better match resources.

61. Trade restrictions have been used for environmental protection purposes. Examples are the ban on tuna fish imports from certain sources in the United States and the quotas imposed by the European Community and Japan on pig iron imports from Brazil, on the grounds that the production of charcoal used to produce pig iron in the latter country was harmful to forests. Following this, new reforestation laws were enacted in Brazil to limit cutting in natural forests. The use of trade restrictions to such ends, however, remains controversial because, when imposed unilaterally, there is the risk that they might, instead, be aimed at protecting domestic producers.[17]

62. Among minerals and metals, **tin** provides an example where environmental regulations have both increased the cost of production and had a positive influence on demand for pure tin in the solder industry. This is because of legislation enacted by Governments, particularly in Western Europe, the United States and Japan, limiting the use of **lead** in lead-tin alloys for the food canning industry. In the United States, it is envisaged to limit the maximum amount of lead allowable in food packaging. This would require the use of tin with a much higher purity than at present. Supply changes to comply with this requirement have already occurred. A new standard tin grade has been proposed and some producers, for example, in Indonesia and Thailand, have started producing tin of low lead content. In contrast, environmental and health-related concerns have adversely affected the demand for lead. In these cases, some of the environmental costs and benefits have been internalized and allowed to influence the markets. Likewise, demand for **phosphate** has fallen because of the drastic reduction in the use of phosphate fertilizers and detergents in the major markets for this commodity, partly as a result of concern for the negative impact of phosphates on the environment, as reflected in regulations adopted within the European Community and in the United States of America.

63. Measures such as charges, taxes or other regulations aimed at accounting for pollution and land reclamation, which in general are the major environmental effects of mining operations, would entail additional costs for the mining firms. For example, it has been estimated that stricter environmental regulations may add up to 15 per cent, in real terms, to the cost of **copper** production and 12 per cent to that of **aluminum** production by 1995.[18] Such regulations may also entail additional barriers to entry into mining activities.

64. Another example of the need for prices to rise to take account of protection of the environment is the forestry industry. Few areas have attracted as much interest as forestry regarding the environment. Currently only a very small percentage of the world's tropical forests are under sustainable management. An estimate some years ago was only 1 per cent, and the percentage has probably not gone up much despite intense efforts and commitments to achieve sustainable development of tropical forest resources. It is widely believed that sustainable management of tropical forests will result in lower yields of **tropical timber**. Lower yields are likely to result in higher per unit costs. In order to cover these costs, market prices for tropical timber would need to rise.

65. Global tropical forest loss as a result of logging is, however, a relatively minor part of total deforestation. Close to two-thirds of deforestation is attributable to the conversion of forest land to agriculture. The more profitable the exploitation of timber, the less likely its conversion to other uses and the more important sustainability and preservation of the resource base becomes for the owners of the forest. When the rate of timber harvesting was reduced in Sarawak (Malaysia), the rural people who earned their living from the timber industry turned back to the old system of shifting cultivation, where sections of the forest were progressively cleared to plant crops. It was believed that the recurrence of shifting cultivation could be avoided only through an integrated policy encompassing the conservation of forests while deriving adequate economic returns from forest use. This, in turn, would require government involvement and considerable resources. Increased productivity in agriculture may also help conserve forests by reducing the need for additional cleared land.

IV. EXTERNAL INTERFERENCE IN COMMODITY MARKETS

1. Government intervention

66. One interference with the working of commodity markets is government intervention in developed and developing countries. This intervention implicitly, and sometimes explicitly, assumes that free markets are not suitable for the pursuit of specific domestic policy objectives. Indeed, as has been suggested above, intervention is sometimes required to correct market failures. However, intervention aimed at achieving domestic policy objectives leads to a fragmentation of international markets for the commodities concerned, and it has a distorting influence on these markets. Since developed countries carry more weight as markets and as participants in commodity trade, and they have the resources to carry out large-scale interventions, their influence on the operation of international commodity markets is much more significant.

67. Prominent in this respect is the case of a number of agricultural products such as grain, sugar, vegetable oil and oilseed, cotton, meat and dairy products, for which internal support policies exist in the form of price support to farmers, border protection and/or export subsidies. These policies in developed countries are of such a magnitude that they have encouraged production of the commodities concerned above the level that they might otherwise have reached, thus reducing domestic demand for imports or leading to higher export availabilities with their attendant impact on the world market.

68. The magnitude of this intervention is illustrated by the fact that, according to estimates made by the Organisation for Economic Cooperation and Development (OECD), the cost of agricultural programmes in all member countries was US$ 320 billion in 1991, a figure which is about three times greater than the amount of aggregate export earnings from all non-fuel commodities of developing countries. As a result of domestic policies, the United States of America and the European Community, for example, have become net exporters of certain products, for instance sugar, and have increased their shares in world export markets for several other agricultural products. In the 1980s, the European Community almost doubled its share in world grain exports other than rice; member countries strengthened their position in world markets for bovine meat. The United States and Canada almost tripled their shares of world bovine meat exports.

69. In **sugar**, government intervention in a number of producing and consuming countries has segmented the market; the size of the free portion of it shrank considerably. Intervention has resulted in a significant proportion of sugar trade being carried out under preferential arrangements and in protective regimes in many sugar-producing countries, including the two major markets, the European Community and the United States of America.

70. The European Community support policy is based on intervention prices at which agencies in the European countries have the obligation to buy raw or white sugar from European producers, within the limits of a quota. In order to protect this system, an import levy almost completely closes off the Community from the world market. The import levy amounts to the difference between the internal and the world prices, the latter being much lower. This levy has made imports prohibitive. Nevertheless, sugar produced in excess of internal Community needs (because intervention prices are above market equilibrium prices) but below the maximum quota receives export subsidies ("restitutions") to enable it to compete

in world markets. A similar guaranteed price is applied to raw sugar imported into the Community from ACP countries.

71. In the United States, similar protection is implemented through an internal price support system operated by the Commodity Credit Corporation (CCC) Loan Programme. This Programme maintains the domestic sugar price above the rates of loans to producers (the price floor). Imports are effectively controlled through a tariff-quota system. Under this quota, imports enter the market duty free from GSP and Caribbean Basin Economic Recovery Act beneficiary countries, and at a low duty from selected countries to which shares of the global quota are allocated. Additional imports are subject to a prohibitive tax (16 cents per pound of weight). The distortions so introduced into the sugar market spill over to other markets, like those for sugar substitutes and, in particular, the corn market. The artificially high domestic prices for sugar have spurred competition from alternative sweeteners, among them, high fructose corn syrup (HFCS) which in 1990 accounted for 6.2 per cent of world sweetener consumption, and low-caloric sweeteners, for 5.8 per cent.

72. There is a trend now towards giving greater consideration to market forces in the sugar industries in Australia, Brazil and Mexico. Changes are also looming in the European Community, China and India, and on a smaller scale, in Chile, Morocco, Turkey and Venezuela. In the European Community, in particular, the CAP reform is likely to reduce the internal price support over time, against the background of budget pressures and the trade negotiations of the Uruguay Round.

73. Sugar preferential trade, however, has considerably lost importance owing to the reduction in Cuban total exports and particularly the drop in Cuban preferential supplies. As a result, sugar preferential trade, which used to include some 4 to 5 million tonnes per year between Cuba and the former USSR, has now essentially been reduced to the ACP Protocol with the European Community, the United States of America quota market and the Cuba-China barter arrangement. Preferential trade in 1991 was thus down to about 13 per cent of world trade, as compared to 35 per cent in 1989 and over 40 per cent in 1982.

74. **Grains** are considered of strategic importance in many countries, including in the European Community and in the United States, and are subject to domestic support policies and export subsidies. In the Community, imports of wheat are controlled at the border through the imposition of a variable levy, which is the difference between the world price and a threshold price. This levy is set at a prohibitive level in order to protect domestic production, which is supported through an export subsidy, a storage subsidy and a production subsidy. There are pressures in the Community towards reducing the amount of protection so afforded to wheat producers, as in the case of other agricultural products. In the United States, price support for producers of wheat, maize, rice and sorghum is provided through loans implemented by the CCC. Under this programme, a price floor is set by the rate of the loans granted to farmers using their commodities as collateral. Further income support is implemented through "deficiency payments" made to farmers in order to guarantee a target price.

75. The market for **bovine meat** in the European Community functions similarly to the grain market. Intervention buying and export restitutions support the internal price, with additional storage and other aid supplementing farm income. The price of imports is supported by the variable levy plus a nominal tariff. Intervention by the European Community in the bovine meat market is considered one of the most influential factors affecting this market. In the United States,

there is no price support for this product, but imports are controlled through import quotas applying when import volumes reach a level that triggers them. In recent years, voluntary export restraint agreements have been negotiated with some developed country suppliers to avoid the imposition of such quotas. The United States prohibits imports of beef from certain countries as protection against bovine foot and mouth disease.

76. Because of its magnitude, government intervention in developed countries is a major factor influencing the world markets for the products mentioned above. According to UNCTAD secretariat estimates, full trade liberalization would result in increases in world prices of the order of 40 per cent for sugar, wheat and bovine meat, 11 per cent for oilseeds, and 7 per cent for vegetable oils.[19]

77. Border measures applied by individual countries on commodity imports also affect supply and demand in the markets. The incidence of tariffs varies with the commodities considered. Whereas for many commodities tariffs are not a significant problem, some agricultural products face high tariffs, although the negative impact of high MFN rates is attenuated by the preferential access granted to many products under various systems of preferences: the GSP; the Caribbean Basin Initiative and the Andean trade package granted by the United States; and the Lomé Convention between the European Community and the African, Caribbean and Pacific (ACP) countries. However, many tariffs, including under preferential regimes, show a tendency to escalate with the degree of processing; this discourages the processing of commodities in producing countries. A wide array of non-tariff measures is used effectively to control imports, including quantitative restrictions such as those embodied in the Multifibre Arrangement (affecting **cotton** and other textiles), and the "voluntary restraint agreements" negotiated by the United States to limit imports of **iron and steel**, among others.[20]

78. **Bananas** are a case apart. The European Community market for bananas has traditionally been highly organized and compartmentalized in order to protect the banana production of member countries and of ACP countries, where costs of banana production are higher than in other supplying countries and diversification opportunities are mostly lacking. For this reason, market access in six member States (France, Greece, Italy, Portugal, Spain and the United Kingdom) has been determined by national quota regimes rather than by the Community's 20 per cent tariff or, as in Germany, by a zero-tariff quota. France, Italy (until December 1992) and the United Kingdom operated these restrictions to protect preferential imports from ACP suppliers as well as from overseas territories.

79. This organization of the banana market in the European Community, which was accepted by exporters as declared in the "Canary Islands Consensus" of 1967 (re-endorsed, updated and extended in the Declaration of Guayaquil, in 1989), was called into question by the plans to establish a single internal Community market. This required the national banana markets to become a single market, harmonizing national import measures in a common system. To this end, a new regime became effective on 1 July 1993. It is based on tariff quotas and licenses granted to operators marketing bananas from the various sources. Concern has been aroused among interested parties as to how each might fare under this regime.[21] The banana market shows the difficulty of achieving market liberalization while at the same time taking into account the social dimensions of commodity production and trade.

80. In contrast to developed countries, in developing countries the ability to subsidize production is limited and high levels of poverty are felt to require cheap, not dearer food. Therefore, sectoral support policies have been the exception rather than the rule. However, national marketing organizations have been used in many developing countries (particularly African) to ensure a stable level of prices and income to producers of some major agricultural export commodities. Whereas prices established under such mechanisms have tended to be lower than world market prices, protecting producers from price volatility in world markets was considered a desired social objective. Such a policy may, however, have weakened the link between supply and world price signals, reducing the risks associated with price fluctuations, and thereby contributing to oversupply. Liberalization in these countries has resulted in the dismantling of marketing organizations, but ensuring stable prices to producers remains an objective of commodity policy in many of them.

81. In many highly indebted developing countries, Governments have tried to induce a shift of resources into the production of exportable commodities, often at the cost of the availability of goods for domestic consumption. In other cases, the need to preserve employment, to earn foreign exchange and to avoid heavy closure and reopening costs has been a powerful influence for Governments to maintain operating levels in the mining industry in periods of low prices. This has been attempted, for example, through the granting of low-interest loans, the subsidizing of temporary losses and the provision of tax exemptions.

2. Private outside intervention

82. Although different in nature and intent to government intervention, the presence in commodity markets of economic agents not directly involved in commodity production, use or trade can also introduce distortions into their workings. This may be the case on some commodity futures markets where large-scale trading by financial investors is increasingly occurring.

83. Price formation mechanisms, if they are to reflect market forces, should use efficiently all information available on current and expected supply and demand and on this basis generate prices which are then equally available to all market participants. Against these criteria, futures markets appear to be the closest approximation of perfect markets, especially when compared to bilateral, over-the-counter or producer price mechanisms. They may also be preferable to auctions and organized forward markets where prices are transparent but trading requires a direct matching of deals at each point in time. Consequently, futures markets have increasingly played a role in commodity price formation. There are now futures contracts of one sort or another for most major commodities in international trade, although many of these contracts have limited domestic or regional applicability. Commodity buyers and sellers are increasingly using exchange-generated prices as reference prices for their physical trade deals.[22]

84. The complication which arises is that for commodity futures trading to be liquid and deep (i.e., that there be many unrelated participants) both commodity operators and non-trade-related operators (speculators) are required. The optimum balance between these two groups is a moot question. In the past few years, there has been a significant increase in futures' market turnover associated with non-trade-related activities of large institutional investors seeking to diversify their investments. These investment funds usually take large positions relative to trade-related participants and so require liquid markets. Their activities are usually short-term and often result in rapid shifts in investment finance among the different financial and commodity

markets. In addition, as investment funds base their trading decisions on technical analysis and frequently take similar market positions at the same time, their activities may exacerbate the size of price movements, thus increasing short-term price volatility.

85. Moreover, price formation for commodities through futures markets, when involvement of such funds is sizable, becomes influenced by global considerations beyond the specifics of the commodity. Prices are thus increasingly one element in the world financial situation. As the involvement of institutional investors in commodity futures trading is quite recent and the implications are not well understood, further work on this issue is required.

V. POLICY IMPLICATIONS

86. One major goal of international cooperation in commodities, as mandated by Governments, is to improve the functioning of commodity markets. This requires addressing the factors introducing distortions and therefore causing failure in the efficient allocation of resources by the markets. Achieving this goal appears to be a necessary condition to improve the situation of commodity exporting developing countries. Complementary to this is action aimed at facilitating adjustment to changes in supply and demand by commodity producers and exporters by dealing with the structural determinants of such changes. Therefore, both lines of action should be regarded as interrelated under the "new, market-oriented approaches to commodity policies" that the Conference instructed the Standing Committee on Commodities to explore.

87. This approach is particularly relevant in view of the profound changes that have taken place in the world scene, making it necessary to assess the implications of these changes for the current framework under which international action on commodities has been carried out during the past two decades. These changes include: (a) The trend towards giving greater emphasis to market forces through trade liberalization, market deregulation and the use of market-based instruments. (b) the growing globalization of the world economy with the consequent need to harmonize domestic and international policies in areas that go beyond the strictly trade dimension. (The implications of this have been observed both at the multilateral level, particularly in the Uruguay Round negotiations, and at the level of groups of countries with the possible emergence of economic blocks; the need to assess the impact of these developments on commodities arises particularly in connection with the agricultural sector which is one of the key areas of negotiation in the Uruguay Round.) (c) The growing concern for the environment and the prominent role attributed to the notion of sustainable development.

1. The parameters of commodity policies for the 1990s

88. The search for approaches to commodity policies for the 1990s needs to include both a *commodity* and a *country* dimension. Some of the factors identified in the previous sections call for international cooperation centred around individual commodities. This is needed, in particular, to mitigate the imbalances affecting individual markets. Action here should be based on in-depth analyses of individual market structures. Producer-consumer cooperation organizations on individual commodities could be used, among others, as institutional frameworks for this work.

89. However, problems in commodity markets translate into problems for producers and exporters, particularly those more vulnerable because of their low

income and high dependence on commodities for their living. This includes many developing exporting countries. Persistent low prices have depressed incomes while price volatility has contributed to fluctuations in export earnings. Virtually all developing countries have experienced sustained or recurrent shortfalls in their commodity export earnings during the 1980s.[23] However, the link between imbalances in the markets and problems for commodity producers is complex. Individual producers of the same commodity are diversely affected and face specific problems. Illustrations of this fact are the conflicts of interest arising from plans to integrate and liberalize the banana market in the European Community, the problems raised for net food-importing countries by efforts to liberalize trade in food commodities, such as they are discussed in the Uruguay Round of multilateral trade negotiations, and in general the trade preferences enjoyed by some developing countries against other developing countries (e.g., within the European Community and the United States).

90. Furthermore, one of the ultimate goals of commodity policies is to maximize the contribution of the domestic primary sector to the economic and social development of individual developing countries. In turn, many problems in commodity markets have their roots in what could be termed a development failure, resulting in the inability of many developing countries to face economic and social challenges including actions to improve the situation of their commodity sectors, because of gaps in their level of human resource development, insufficient access to finance resources, and generally low levels of income. An institutional framework for this country dimension may need to be established, including, for example, regular exchanges among Governments of experience with domestic commodity policies, either in *ad hoc* meetings for this purpose or in the context of the Standing Committee.

91. Approaches to commodity policies for the 1990s should take account of the need for selectivity and disaggregation. Not all commodities are affected by every factor indicated, or not in the same manner or to the same extent. Likewise, individual producers are in specific situations and face different problems, even regarding the same commodities. Whereas there is an old debate, both in economic theory and policy-making, about the most appropriate ways of removing distortions (linked to the development, in welfare economics, of the theory of the second best), a proper assessment of these issues can only be made on a case-by-case basis. The characteristics of the commodities and countries involved, the particular situation of the markets, the range of policy instruments available and the experience gained in past actions are some of the relevant considerations for such an assessment.

92. At the same time, international commodity policies should be designed from a comprehensive perspective. Markets for individual commodities are not water-tight, and action on any one of them may also affect others. A clear illustration of this may be found in the problems arising from diversification from one commodity into other commodities. Another, related, reason is that individual commodity exporting countries typically have an interest in the production and export of several commodities, and so trade-offs are possible and the design and implementation of domestic policies must encompass the whole country's commodity base. The links between the markets for different commodities, as well as between the various domestic policies, thus cannot be ignored in international commodity policies. It is essential to strive for compatibility and coherence of domestic and international policies affecting the commodity sector. This approach calls for the setting up of monitoring and coordinating mechanisms.

93. Finally, participation in the design and implementation of international cooperation in commodities should be as universal as possible, involving all who are directly or indirectly affected by such action. Commodity policies for the 1990s should result from a process of reflection and dialogue among Governments, United Nations institutions and other agencies, academic institutions, non-governmental organizations and the business community, including industry associations, which in developing countries have assumed a greater role following the trend towards privatization. How to institutionalize the involvement of these actors in the various areas of international cooperation in commodities is one policy issue to be addressed under a new approach to such cooperation.

2. Issues for future work

94. The comprehensive analysis of commodity policies called for by UNCTAD VIII would need to identify the extent to which each of the factors discussed above affects individual commodities and countries; a related issue is how to deal with each specific factor in the light of the special characteristics inherent to commodities and countries, including the assessment of the extent to which current international cooperation contributes to solving problems. One dimension of the latter is the extent to which various policies and measures, national and international, are compatible and coherent from a global perspective. The questions to be addressed flow from the factors analysed.

95. Regarding the **factors that hamper the efficient working of commodity markets** and are responsible for failure in allocative efficiency, the relevant questions include the following:

(a) *Market transparency*: What are the most serious gaps in information for each commodity? What are their implications, and in what areas could the functioning of the market be improved through better information? What kinds of instruments can be used to improve the availability and dissemination of information?

(b) *Production policy and investment decision-making*: one particular issue regarding information relates to decisions on commodity production which will result in output changes only after investment gestation periods. What kind of mechanisms (including exchange of information on investment plans) would improve the harmonization of investment decisions in commodity production, so that producers, particularly those embarking upon diversification programmes, and consumers can gain a clearer perception of future market conditions, thus helping to prevent periods of oversupply as well as of insufficient supplies and achieve supply/demand equilibrium over time? Under what conditions could internationally agreed production policies help address problems of oversupply? How should such policies, when appropriate, be designed and implemented? What are the best institutional arrangements, formal or informal, for this purpose in the case of each commodity (in the context, for example, of intergovernmental groups or specialized *ad hoc* organizations)?

(c) *Stock policy*: Could arrangements be introduced that would improve information on the location and ownership of stocks for a number of commodities? Under what conditions can stocks be disposed of in ways that do not disrupt the market or be used to stabilize the markets for individual commodities in the short run in a cost-effective way, and what could be the link with the production policy mentioned above?

(d) *Entry to and exit from commodity activities*: Which barrier, for each commodity and country, among the barriers to entry and exit, including obstacles to diversification, processing and marketing, both at national and international levels, can be tackled and how? For which commodities and countries is there a link between poverty and market failure? What kind of policies have been tried in these areas and what assessment can be made of their results under the specific conditions of individual commodities and countries? How have policies of privatization, deregulation and liberalization affected the structure of commodity markets? In which areas is there a need for international support and what progress has been made so far on an agenda for international cooperation on these issues? Responses to these questions will need to take into account, and policies will need to be specific to, the particular structure of the industry and of the markets, including the kind and scale of production units (e.g. domestic or foreign-owned plantations, large capital-intensive mining operations or small-scale units) as well as marketing channels (official, domestic private and foreign subsidiaries) prevailing in each country/commodity.

(e) *Sustainable development*: What are the environmental externalities associated with the production, consumption and trade of different commodities? What are the differences among countries regarding environmental consequences of production of any given commodity? What kind of instruments can be applied to internalize environmental externalities in each particular case, including the need for and possible sources of funding? In what cases is there a need for international concerted action (for example, in the form of international agreements to reduce or internalize specific environmental externalities) rather than a national approach to environmental action? How can international environmental regulations be prevented from creating additional barriers to entry in commodity activities, adversely affecting those producers and countries with less resources? How can the risk be avoided of trade restrictions for environmental purposes becoming a new form of protectionism?

(f) *Outside intervention*: What further work is needed on the implications of increasing non-trade participation in commodity exchanges on price formation? Regarding governmental intervention, how should the impact of domestic policies on international commodity markets be kept under review? Could other forms and instruments be explored and discussed for pursuing specific policy objectives by Governments in a way that they do not distort commodity markets? Could mechanisms, including direct support and/or compensation, be found to facilitate progress towards trade liberalization without adversely affecting those developing countries, particularly poor countries, which currently benefit from protection under preferential regimes?

(g) *Producer/consumer cooperation*: What role could be played by producer/consumer cooperation in specific commodities, such as under international commodity agreements? How should these be designed in order to deal with the various questions raised in this section, due account being taken of the experience accumulated in this area?

96. Dealing with **structural determinants of supply and demand** would be greatly facilitated if the working of the markets could be made more efficient by removing distortions. In connection with technological progress in the commodity sector, relevant issues include: how to improve the functioning of the technology market so that technology does not become a factor restricting entry into the commodity industry; and how to ensure that benefits from technological progress are fairly distributed, including the question of rewarding innovators and that of the fair distribution of benefits between producers and consumers.

POLICY ISSUES IN THE INTERNATIONAL COCOA MARKET

The market for **cocoa**, an agricultural commodity for which smallholding output is significant, with substantial investment lags in production and a large degree of concentration in the demand side of the market, is affected by factors related to market transparency, investment cycles, "social rigidities" and obstacles to diversification, uneven distribution of market power between suppliers and buyers because, among other things, of obstacles to entering into processing and marketing activities, price formation in cocoa futures exchanges, and environmental costs and benefits not reflected in private costs and prices. As such, the price mechanism in the market has not been able, over a long period, to balance supply and demand.

International cooperation to deal with some of these problems dates back to the mid-1950s. Since 1972, successive International Cocoa Agreements have been concluded under UNCTAD auspices. In spite of the broad objectives of these agreements, action has been mainly aimed at preventing excessive fluctuations in the price of cocoa. In this respect, the results have been rather disappointing, indicating among other things the shortcomings of buffer stocks operations alone in a situation of large and persistent excess supply over demand.

The new International Cocoa Agreement, adopted in July 1993, provides for new economic provisions aimed at achieving equilibrium between supply and demand through adjustments of production and promotion of consumption. The new production policy, referred to as the production management plan, will be based on the adoption by the International Cocoa Council of annual forecasts of world production and consumption, and the establishment of indicative figures for annual levels of global production necessary to achieve and maintain equilibrium between supply and demand. In the light of these indicative figures, producing member countries would draw up a programme for the adjustment of their production, and would be responsible for the policies and measures applied for that purpose.

Another problem affecting cocoa as well as many other commodities is the accumulation of large stocks as a result of the supply and demand imbalance. It has therefore been felt necessary to design some form of stock reduction scheme to cut down the excess stocks over normal levels in a gradual and orderly manner which prevents serious disruptions of the market. Action of this kind is being envisaged by cocoa producing countries grouped in the Cocoa Producers' Alliance.

Examples of other actions that might help alleviate the effects of the factors adversely affecting the cocoa market are the discussion of ways to reduce internal taxes and escalating GSP and MFN tariffs applied mainly on semi-processed cocoa products, following a thorough identification of such barriers to market access and their impact on trade flows; of ways to increase consumption of cocoa in low but potentially high consuming countries through, among other things, joint full-scale promotional campaigns; the implementation of non-binding norms and standards on the use of non-cocoa origin substances in chocolate products; the promotion of alternative uses for cocoa and the increased use of cocoa by-products in the area of cosmetics and animal feedstuffs; alleviating the constraints preventing a larger use of cocoa futures exchanges; and the establishment of supranational norms and standards on environmental effects of cocoa production and processing, associated with some sort of "green label" certifying compliance with these standards.

Policies in this area affect both commodity supply and demand. Regarding supply, one major goal is raising productivity in commodity production, thereby enhancing competitiveness in the context of sustainable development. One important aspect of the link between technology and commodity demand growth is related to research into new final uses for commodities. The technology issue is a complex one with significant implications on the environment and on poverty in rural areas, and its various aspects need to be assessed on a case-by-case basis, in view of the commodities affected, the particular capabilities of the countries concerned, the structural characteristics of the industry (small producers or large companies), and the question of any required institutional framework to deal with such issues.

97. Some of the other factors mentioned in the section II could be the subject of international cooperation. Particularly important in this connection is finding the most appropriate mechanisms to promote jointly the consumption of commodities, for example those benefitting from environmental or health advantages, also taking account of the potential of regional markets established as a result of economic integration. Regarding many of the remaining factors, it could be possible to help participants in commodity markets to adjust to them through international cooperation, inter alia, in the following ways:

(a) By improving the availability and dissemination of information, thereby making the markets more transparent. In this way, changes in supply and demand could be better anticipated and their implications better understood, enabling market participants to take action according to their interests in each case;

(b) By monitoring factors affecting commodity markets and assessing their possible implications for producing and exporting countries (for example, redirecting marketing efforts towards markets with better consumption potential could be the outcome of such monitoring). Since a number of organizations, governmental and non-governmental, are already active in some of the areas concerned (e.g., world economic prospects, demography, climatic changes, etc.), a coordinating role might be appropriate to gather and centralize all the relevant information;

(c) By targeting specific categories of producers and countries which, because of their size or lack of resources, are not in a position to have a global view of the markets and of current and impending changes, then designing specific assistance (e.g., technical or financial) to help them to cope with such changes.

Notes

1. Report of the United Nations Conference on Trade and Development on its eighth session, 8 to 25 February 1992 (TD/364) paragraph 190.

2. This elasticity depends on the structure of production, and more particularly on the relation between fixed and variable costs of individual producers (see section III below)

3. Because of the spiral-like graphic representation of this situation, it is known as the "cobweb theorem".

4. See, for example, *Analysis of national experiences in horizontal and vertical diversification, including the possibilities for crop substitution.* Report by the UNCTAD secretariat (TD/B/CN.1/14)

5. This is the backward-sloping supply curve often discussed in economic literature in connection with the supply of labour at subsistence levels of income.

6. See John Proops, Paul Steele, Ece Ozdemiroglu and David Pearce, *The Internalisation of Environmental Costs and Resource Values: A Conceptual Study.* A draft report to UNCTAD, Geneva, by CSERGE and EFTEC, July 1993.

7. In strict theoretical terms, allocative efficiency can be shown to imply a welfare optimum in the sense of Pareto, i.e., if allocative efficiency is not achieved, it is always possible to make someone better off without making anyone else worse off.

8. See *UNCTAD VIII. Analytical report by the UNCTAD secretariat to the Conference.* United Nations, New York, 1992, paras. 909-915.

9. See Ulrich Hoffmann and Dusan Zivkovic, *Demand Growth for Industrial Raw Materials and its Determinants: An Analysis for the Period 1965-1988.* United Nations Conference on Trade and Development, Discussion Paper No. 50, November 1992.

10. See *The improvement of information flows to aid investment decisions.* Report by the UNCTAD secretariat (TD/B/C.1/AC/11), 23 August 1990.

11. G. W. Walrond, *Policies Regarding Small-Scale Mining,* UNCTAD, International Seminar on the Role of the Mineral Sector in the Economic Development of Africa (Ouarzazate, Morocco, 27-30 April 1992), Proceedings of the Seminar (UNCTAD/COM/7), 6 August 1992.

12. See, for example, *Analysis of national experiences in horizontal and vertical diversification, including the possibilities for crop substitution.* Report by the UNCTAD secretariat (TD/B/CN.1/14); General Assembly, *Critical economic situation in Africa: final review and appraisal of the implementation of the United Nations Programme of Action for African Economic Recovery and Development 1986-1990.* Report of the Secretary-General. Addendum: Implementation of diversification in the commodity sector in Africa at the national, subregional and regional levels with the support of the international community (A/46/324/Add.1), 14 August 1991.

13. See *Analysis of national experiences... op. cit.* (note 4).

14. For many agricultural commodities, in particular raw materials, the industry structure could be graphically represented as an hourglass: Wide at the bottom, as the number or producers of the unprocessed commodity is large (and the degree of concentration is low), becoming narrower higher up as the number of firms decreases at the processing stages, and widening again at the top as the number of final manufacturers or retailers increases.

15. See *Structural changes in the world minerals industry during the 1980s,* Report by the UNCTAD secretariat (UNCTAD/COM/25), June 1993

16. See *Experiences concerning environmental effects of commodity production and processing: synthesis of cases studies on cocoa, coffee and rice.* Report by the UNCTAD secretariat (TD/B/CN.1/15).

17. See *Trends in the field of trade and environment in the framework of international cooperation.* Report by the UNCTAD secretariat (TD/B/40(1)/6).

18. See *Report on world commodity trends and prospects, with particular emphasis on commodity-dependent developing countries in the light of the outcome of the eighth session of the United Nations Conference on Trade and Development*. Report by the Secretary-General of the United Nations Conference on Trade and Development (A/47/398), 23 September 1992, para. 117.

19. See *Agriculture in the Uruguay Round: Estimated Trade Effects of Proposals for Trade Liberalization Tabled in 1990 and 1991*, Agricultural Trade Policy Simulation Model (ATPSM), UNCTAD/UNDP, July 1992.

20. These barriers are the subject of negotiation in the Uruguay Round.

21. See FAO, *Policy developments and their impact on the world banana economy* (CCP: BA 92/6), September 1992; *Banana Information Note* (ESC: BA 93/1), February 1993.

22. See *Analysis of ways of improving the efficiency and use of existing mechanisms for the management of risks arising from commodity price fluctuations* (TD/B/CN.1/10); and *Technical and regulatory conditions influencing participation in, and usage of, commodity exchanges by both buyers and sellers of commodities (UNCTAD/COM/16)*

23. See *Review of developments in the field of compensatory financing of export earnings shortfalls*. Report by the UNCTAD secretariat (TD/B/CN.1/11).

ANNEX

LONG-TERM MARKET SITUATION FOR INDIVIDUAL COMMODITIES

1. Recurrent oversupply

1. As a result of the supply and demand imbalance, real prices for tropical beverages (coffee, cocoa and tea) combined fell by 52 per cent during the past ten years. World **coffee** production reached a peak of 108 million bags (of 60 kilogrammes.) in 1987/88, exceeding demand by some 20 million bags, and leading to a record increase of 16 million bags in 1988/89 opening stocks. Although coffee consumption grew strongly to reach 95.7 million bags in 1991/92, output grew even faster, reaching 103 million bags in that season, and known stocks accumulated steadily in both exporting and importing countries, in particular rising in the latter following the suspension of export quotas under the International Coffee Agreement in 1989. Regarding **cocoa**, following the drought-affected years of 1982/83 and 1983/84, cocoa production has consistently exceeded demand, resulting in unprecedently high levels of cocoa stocks. This has kept cocoa prices at extremely low levels of around US$ 1,000 per tonne, in spite of a production deficit in 1991/92 and expectations of a further shortfall in 1992/93. In June 1992, cocoa prices fell to US$945, their lowest level in 19 years in nominal terms and the lowest level ever recorded in real terms. World **tea** output grew steadily since 1981, rising from 1.9 million tonnes in 1981 to 2.5 million tonnes in 1991. It exceeded consumption persistently with the exception of 1991. This trend is expected to continue, as demand for black tea is forecast to grow at a slower rate than supply until the end of the decade. This would further weaken already depressed prices. Concerning **sugar**, although a further production surplus was originally envisaged for the 1992/93 crop cycle, revised estimates show a deficit, following adverse climatic conditions and other difficulties in some producing countries. This comes after a decade in which production exceeded consumption with the exception of the crop years 1980/81 and 1986/87 to 1988/89, in spite of demand growing at an average annual rate of 2 per cent. Prices for sugar were most of the time depressed, reaching a record low in real terms in 1985. Production of **palm oil** more than doubled between 1981 and 1991, from 5.2 to 11.8 million tonnes, exceeding strongly growing consumption. Stocks, therefore, increased.

2. Since the 1980s, **wheat** production has been growing steadily with the exception of the 1987/88, 1988/89 and 1991/92 seasons. Known stocks built up as a result, reaching a peak of 176 million tons in 1986/87, although the subsequent production shortfalls brought them to the still high level of 126 million tonnes, which is about 22 per cent of consumption. World production of **rice** grew steadily over the past decade, rising from 412 million tonnes in 1981 to a record level of 522 million tonnes in 1990. Demand, however, kept pace with supply, although many low-income food deficit countries face constraints in meeting their consumption requirements. Known stocks fluctuated between 46 and 59 million tonnes, except in 1991 when they closed at a record level of 64.5 million tonnes.

3. Growth in agricultural raw material output has also been strong in recent years. As a result, the market for **natural rubber** has been oversupplied, with the exception of a period running from the second half of 1987 through 1988. Although demand for natural rubber grew steadily in consuming countries, this growth was not sufficient to keep pace with output growth. Known stocks in 1991 remained in the vicinity of 1.7 million tonnes, as against production of 5.4 million tonnes. Although world supply of **cotton** fluctuated widely since the early 1980s, the abundant supply conditions in that decade and in the early 1990s kept prices depressed in spite of steadily increasing demand. Cotton output reached a peak of 20.8 million tonnes in 1991, exceeding consumption by approximately 2.4 million tonnes. As a result, 1992 opened with stocks amounting to as much as 9.5 million tonnes. Output in that year is estimated to have declined to less than 18 million tonnes.

4. World production of **tropical timber** (non-coniferous logs) increased by one fifth over the 1980s to 158.8 million tonnes, with large increases in output recorded in South-East Asia. The world catch of **fish** grew significantly from 72 million tonnes in 1981 to a level near 100 million tonnes in 1991. This rapid increase seems related to the creation of a 200 mile-limit Exclusive Economic Zone (EEZ), the use of factory ships and the expansion of aquaculture.

2. Long-term balance, but pronounced medium-term fluctuations

5. The markets for a number of major metals were roughly in balance during the past decade, as demand growth generally was high enough to absorb the increases in supplies. Supply and demand for **copper** grew strongly between 1981 and 1991. World production reached 10.7 million tonnes in the latter year. Copper consumption generally followed the same pattern after a sharp fall in 1982, growing significantly to 10.8 million tonnes in 1991, with demand increasing in particular in OECD countries and in industrializing developing countries of Asia. World known stocks of copper reached a peak of 1.7 million tonnes in 1983 and decreased afterwards to 0.9 million tonnes in 1991. After a severe contraction between 1980 and 1983, production and consumption of **iron ore** rose steadily. For most of the 1980s, production and consumption were in balance. Iron ore production grew more strongly in developing countries, as illustrated by the steady growth recorded in Brazil. Mining capacity for **zinc** expanded in the 1980s and production rose, but so did demand fuelled mainly by residential, commercial and automotive construction. As a result, supply and demand for refined zinc were generally in balance; known stocks remained relatively stable in the range of 0.5 to 0.9 million tonnes, as against production of 7.4 million tonnes in 1991. Consumption of **aluminum** exceeded production for a good part of the 1980s; the two were roughly in balance after 1987 but in recent years a persistent surplus of supply over demand had developed. World stocks, as a result, had increased sharply since 1991. Production growth during the period has been concentrated in developing countries, as has demand growth. In the **nickel** market, the situation of excess supply over demand prevailing in the 1970s was reversed in the 1980s as demand grew steadily after 1982 reaching 806 thousand tonnes in 1991, driven by the expansion of the stainless steel industry. World mine production also grew to reach 871 thousand tonnes in 1991. The market for **petroleum** experienced ups and downs as demand fluctuated widely in response to oil prices and world economic conditions while supply tried to adjust to these changes. In the first part of the 1980s, world demand fell sharply and production fell even more strongly. Both increased rapidly in the second half of the decade, with production growth exceeding demand growth. Production and consumption of petroleum stood at 3,180 and 3,110 million tonnes, respectively, in 1991.

6. World supply and demand for **bananas** grew strongly and were very much in balance over the 1980s. Consumption of **soybean** oil grew faster than production, but stocks had accumulated in the past and they remain at a high level. World supply and demand of **groundnut** oil rose strongly in the 1980s. **Coconut** oil production and consumption also remained in balance for most of the decade, with stocks growing at the end of that period. The level of stocks accumulated, together with the growth in palm oil production mentioned above, kept the real price index for vegetable oils and oilseeds at the end of the 1980s down at 54 per cent of its level in the previous decade. World production and consumption of **tobacco** grew steadily during the 1980s and are expected to continue growing at least until the year 2000, in spite of a trend towards decline in demand in developed countries, offset by growth in developing countries.

3. Decreasing demand and stagnant or declining output

7. Commodities for which output did not expand in a substantial period recently are hard to find. The most outstanding example is that of hard fibres. World production of **sisal** and **henequen** declined steadily since 1981. Although accurate figures on consumption of hard fibres are not available,

these fibres appear to have suffered severe market losses over the years in their traditional end-use as baling twine for agricultural purposes. **Coir** and **abaca** also suffered from weak markets. World production of **manganese** tended to stagnate; in 1990 it was 9 per cent lower than in 1980. This contraction followed a decline in demand for lower grade ore. However, production increased in those countries exporting high grade ore, as this enjoyed buoyant demand. The **tungsten** market remained largely oversupplied during the 1980s despite a drastic fall in the number of mines as well as in world mine production, while China doubled its production to account for more than half of total world output. Demand declined at the end of the decade. As a result, known stocks rose from 4.1 thousand tonnes in 1981 to 6 thousand tonnes in 1991, compared to world mine output of 39 thousand tonnes in the latter year.